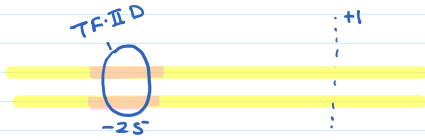


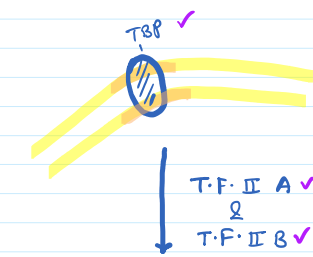
# # Mechanism of Transcription in Eukaryotes

## Transcription by RNA Pol. II $\Rightarrow$

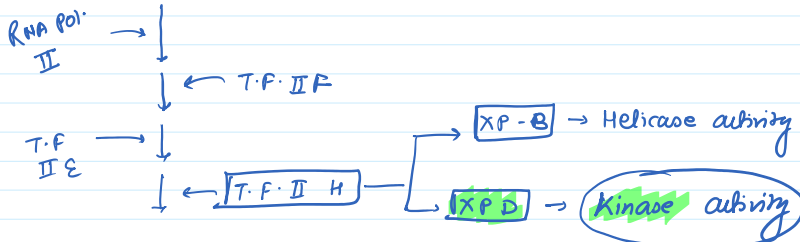


TFIID [TATA Binding Protein] (TBP)

- multiple subunit
- Recognize minor groove of DNA
- TBP contain  $\beta$ -Sheet in its Str.
- $\beta$ -Sheet insert b/w DNA strand of TATA Seq.



Induce Bending in DNA by  $80^\circ$   
 $\downarrow$   
 H-Bond melting start



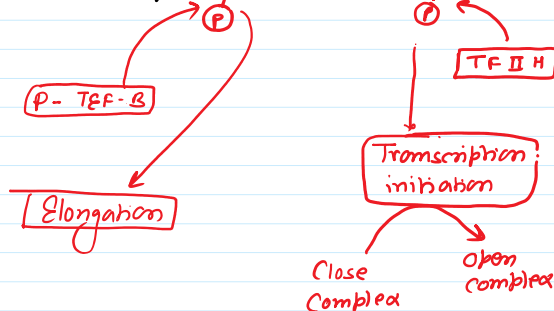
add P on CTD of RNA Pol. II

• CTD of RNA Pol. II contain

Heptapeptide Seq. (7 a.a.)

Conserved Seq.

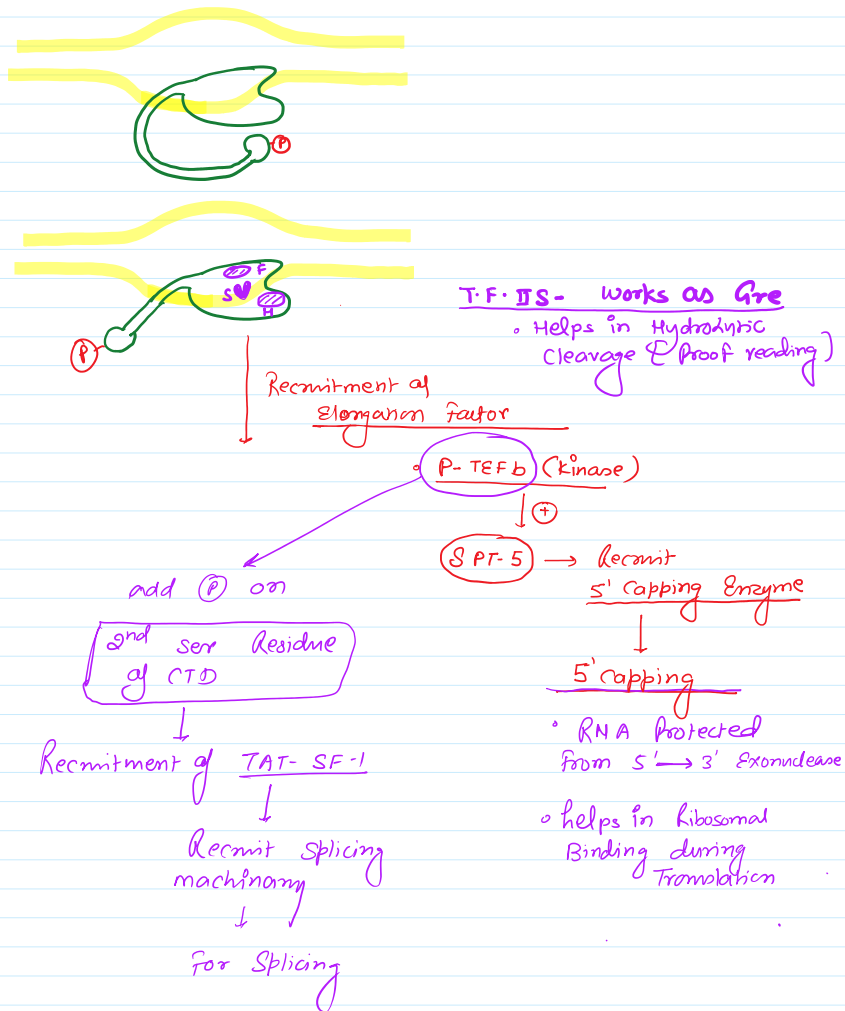
CTD - ① - ② - ③ - ④ - ⑤ - ⑥ - ⑦  
 Tyr - Ser - Pro - Thr - Ser - Pro - Ser



Heptapeptide Seq. Conserved during Evolution  
 & the No. of these Seq.  $\uparrow$  during  
 Course of Evolution.

- \* Yeast = 26 times Repeats
- Drosophila - 42 " "
- Human - 52 " "

## # Eukaryotic Transcription Initiation-



SPT-5 - is Homolog of Bacterial Nus G

Nus G and SPT-5 → K/a Elongation factor

TF IIS → also K/a Elongation factor

→ Reduce pause time of RNA pol.

## Initiation of Transcription

CTD → 5<sup>th</sup> - ser - P

↓

Initiation

↓  
RNA Synthesis Starts (30 nt added)

Recruitment PTEFb

add P on SPT-5 & hSPT-5

↓  
Recruit capping Enzyme  
↓  
5' capping start

## Elongation

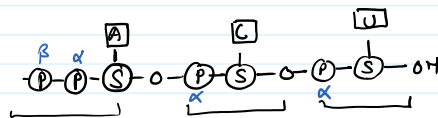
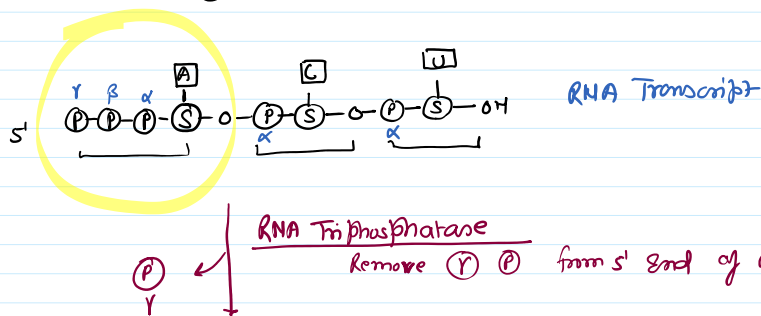
PTEFb

↓  
• add P on 2nd ser.

↓  
Recruitment of TAT-SF1 & other Elongation factor

↓  
TAT-SF1 → Recruit Splicing factor

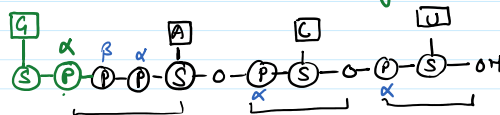
## # 5' Capping



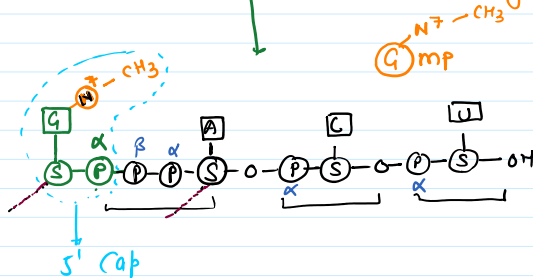
GMP

↓  
Guanyl Transferase

• Transfer GMP at 5' end of RNA



Guanosine methyl Transferase

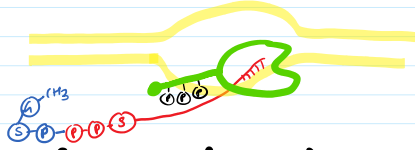


## 5' Capping

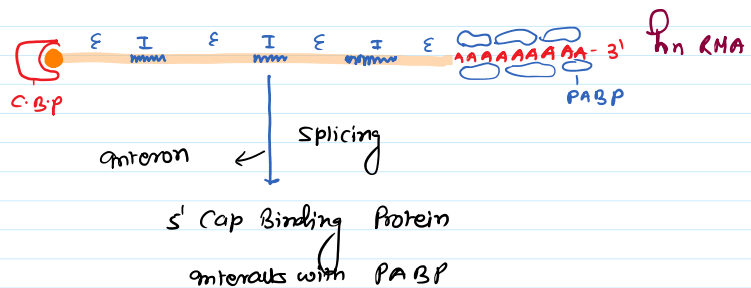
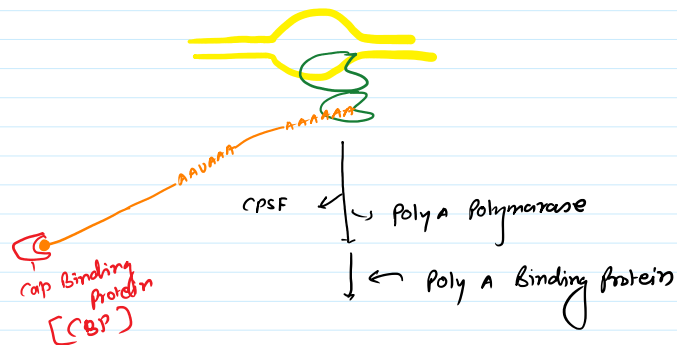
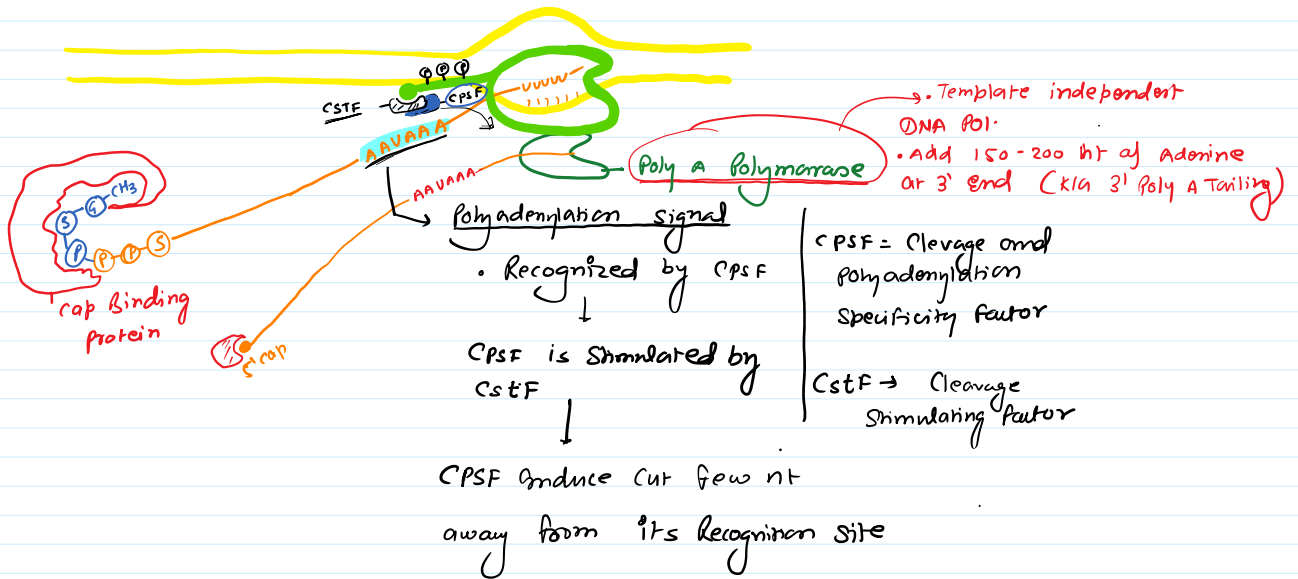
5' cap

## 5' Capping

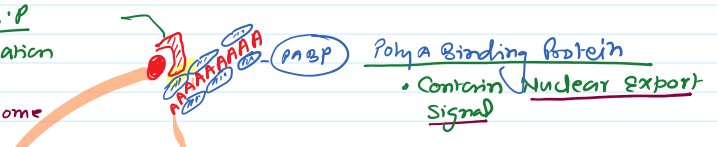
- (i)  $G-M^T-CH_3 = C-0 \text{ cap}$
- (ii)  $GMP - \text{Ribose Sugar} - 2^{\text{nd}} \text{ Carbon} - CH_3 = C-1 \text{ cap}$
- (iii)  $RNA \text{ Ribose Sugar } 2^{\text{nd}} \text{ C.} - CH_3 = C-2 \text{ cap}$

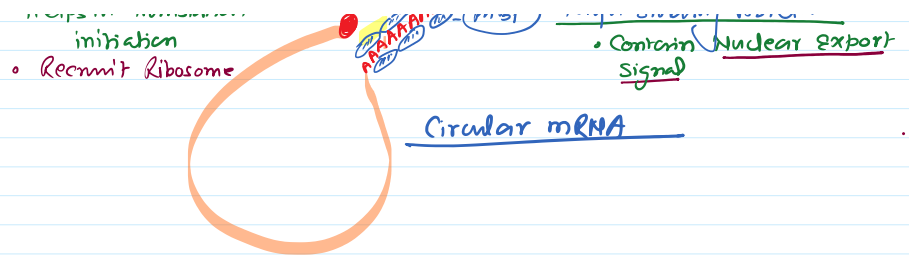


## # Polyadenylation and termination of Transcription.



- Helps in Translation initiation
- Recruit Ribosome





## # Transcription by RNA Pol. I

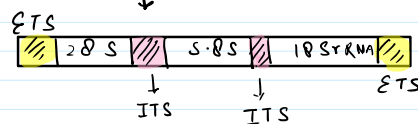
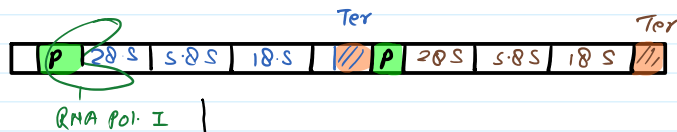
- Codes for tRNA
- Expression of tRNA gene is polycistronic

tRNA gene

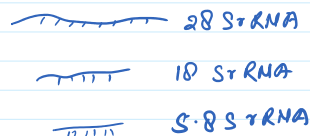
28S tRNA, 5.8S tRNA, 18S tRNA

- tRNA gene tnt on Chromosome No. 13, 14, 15, 21 & 22
- 40 Copies of tRNA gene tnt on each Chromosome
- $40 \times 5 = 200$  Copies tnt of tRNA genes.
- if organism diploid  $2n = 200 \times 2 = 400$  Copies tnt of tRNA gene

## Chromosome No. 13



Splicing by Sno RNA  
Small Nucleolar RNA  
out as Splicesome

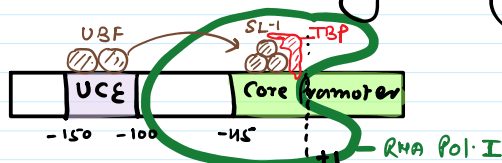


ETS = External Transcribed seq.

ITS = Internal Transcribed seq.

- Establish phylogenetic relationship
- Conserve in nature

## Promoter That is Recognized by RNA Pol. I



UCE = Upstream Control Element.

UBF Binds on UCE & Helps to recruit

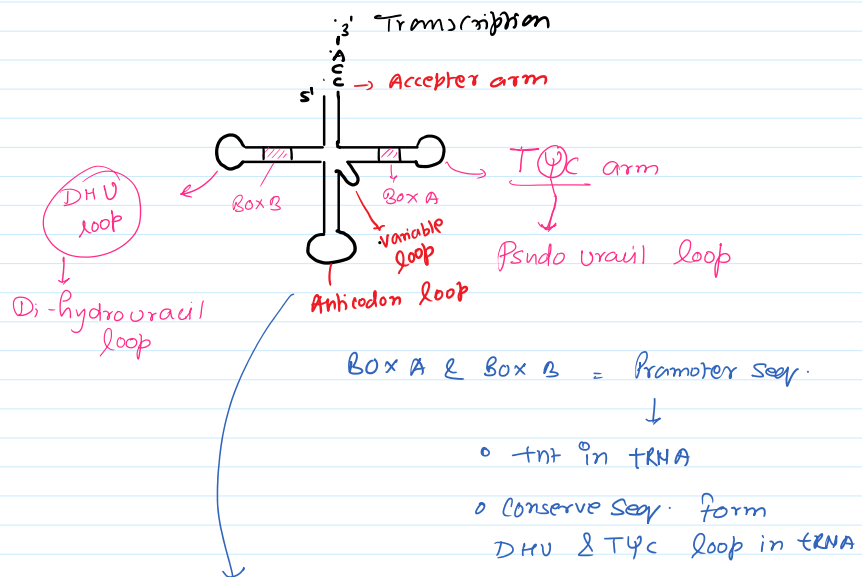
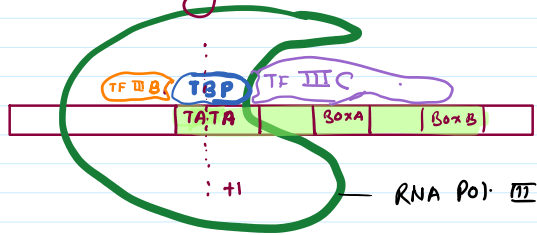
SL1- & TBP

↓  
Recruit RNA Pol. I

## # Transcription by RNA Pol. III

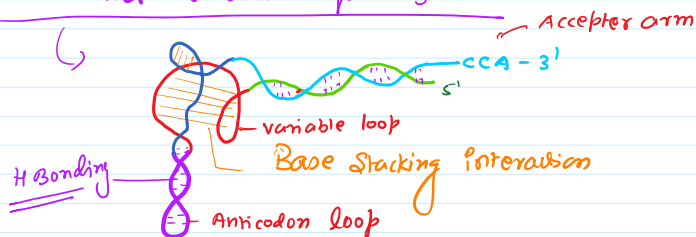
→ Transcribe = tRNA, 5S rRNA & U6 RNA (Sn RNA)

### \* Transcription of tRNA -



2° str. of tRNA K/a Clovel leaf model (stabilized by Watson & Crick H Bond)  
↓  
Non Functional

### Functional tRNA acquir 3° str.



Functional tRNA

## Transcription of 5S rRNA

